SEQUENCE LIS⬤   ⬤

<110> CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

<120> EXPRESSION SYSTEMS OF TOXIC PROTEINS, VECTORS
     AND PROCESS FOR MANUFACTURING TOXIC PROTEINS

<130> B14143 EE

<140>
<141>

<150> FR N ☐ 02 11676
<151> 2002-09-20

<160> 53

<170> PatentIn Ver. 2.1

<210> 1
<211> 37
<212> PRT
<213> Hepatitis C virus

<400> 1
Met Ile Ala Gly Ala His Trp Gly Val Leu Ala Gly Ile Ala Tyr Phe
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Ser Met Val Gly Asn Trp Ala Lys Val Leu Val Val Leu Leu Leu Phe
         20   25   30

Ala Gly Val Asp Ala
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<210> 2
<211> 31
<212> PRT
<213> Hepatitis C virus

<400> 2
Met Glu Tyr Val Val Leu Leu Phe Leu Leu Leu Ala Asp Ala Arg Val
 1   5   10   15

Cys Ser Cys Leu Trp Met Met Leu Leu Ile Ser Gln Ala Glu Ala
         20   25   30

<210> 3
<211> 111
<212> DNA
<213> Hepatitis C virus·

<400> 3
atgatcgctg gtgctcactg gggtgttctg gctggtatcg cttacttctc tatggttggt 60
aactgggcta aagttctggt tgttctgctg ctgttcgctg gtgttgacgc t   111

<210> 4
<211> 93
<212> DNA
<213> Hepatitis C virus

1

<400> 4
atggaatacg ttgttctgct gttcctgctg ctggct___ctcgtgtttg ctcttgcctg 60
tggatgatgc tgctgatctc tcaggctgaa gct   93

<210> 5
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
   oligonucleotide (+) of insertion into pT7-7

<400> 5
gggaatgcca tatgatcgct ggtg   24

<210> 6
<211> 23
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
   oligonucleotide (-) of insertion into pT7-7

<400> 6
gcatatcgat ctaagcgtca aca   23

<210> 7
<211> 131
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: TME1 coding sens DNA
   + 3' cla I site

<400> 7
atgccatatg atcgctggtg ctcactgggg tgttctggct ggtatcgctt acttctctat 60
ggttggtaac tgggctaaag ttctggttgt tctgctgctg ttcgctggtg ttgacgctta 120
gatcgatatg c   131

<210> 8
<211> 131
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: anticodant sens DNA
   + 5' cla I site

<400> 8
gcatatcgat ctaagcgtca acaccagcga acagcagcag aacaaccaga actttagccc 60
agttaccaac catagagaag taagcgatac cagccagaac accccagtga gcaccagcga 120
tcatatggca t   131

<210> 9
<211> 74

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<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
   coding sens oligonucleotide for the synthesis of
   TME1

<400> 9
atgccatatg atcgctggtg ctcactgggg tgttctggct ggtatcgctt acttctctat 60
ggttggtaac tggg   74

<210> 10
<211> 79
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
   anticoding sens oligonucleotide for the synthesis of
   TME1

<400> 10
gcatatcgat ctaagcgtca acaccagcga acagcagcag aacaaccaga actttagccc 60
agttaccaac catagagaa   79

<210> 11
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
   oligonucleotide (+) of insertion into pGEXKT without
   the dp site

<400> 11
ggatccatgg aatacgttgt tc   22

<210> 12
<211> 28
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
   oligonucleotide (+) of insertion into pGEXKT with
   the dp site

<400> 12
ggatccgacc cgatggaata cgttgttc   28

<210> 13
<211> 23
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:

oligonucleotide (-) of insertion int● ●XKT

<400> 13
gaattcctaa gcttcagcct gag   23

<210> 14
<211> 27
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (+) of transfert onto pET32a

<400> 14
gtgatatctg atctgtctgg tggtggt   27

<210> 15
<211> 26
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (+) of insertion into pT7-7

<400> 15
cgcatatgga cccgatcgct ggtgct   26

<210> 16
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (-) of insertion into pT7-7

<400> 16
gaattcctaa gcgtcaacac cagc   24

<210> 17
<211> 19
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (+) of insertion into pT7-7

<400> 17
catatggaat acgttgttc   19

<210> 18
<211> 28
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (-) of insertion into pT7-7

<400> 18
aagcttaagc ttcagcctga gagatcag   28

<210> 19
<211> 103
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: sens DNA
    coding TME2 + 5' Nde I site and 3□Hind III site

<400> 19
catatggaat acgttgttct gctgttcctg ctgctggctg acgctcgtgt ttgctcttgc 60
ctgtggatga tgctgctgat ctctcaggct gaagcttaag ctt   103

<210> 20
<211> 103
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: sens DNA
    anticoding TME2 + 3□Nde I site and 5□Hind III site

<400> 20
aagcttaagc ttcagcctga gagatcagca gcatcatcca caggcaagag caaacacgag 60
cgtcagccag cagcaggaac agcagaacaa cgtattccat atg   103

<210> 21
<211> 68
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    sens oligonucleotide (+) coding for the synthesis
    of TME2

<400> 21
catatggaat acgttgttct gctgttcctg ctgctggctg acgctcgtgt ttgctcttgc 60
ctgtggat   68

<210> 22
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    sens oligonucleotide (-) coding for the synthesis
    of TME2

<400> 22
aagcttaagc ttcagcctga gagatcagca gcatcatcca caggcaagac gaaacac   57

<210> 23
<211> 19
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (+) of insertion into pGEXKT without
    the dp site

<400> 23
ggatccgaat acgttgttc   19

<210> 24
<211> 25
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (+) of insertion into pGEXKT with
    the dp site

<400> 24
ggatccgacc cggaatacgt tgttc   25

<210> 25
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (-) of insertion into pGEXKT with
    the dp site

<400> 25
gaattcttaa gcttcagcct gagagatcag   30

<210> 26
<211> 27
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    oligonucleotide (+) of insertion into pT7-7

<400> 26
cgcatatgga cccggaatac gttgttc   27

<210> 27
<211> 27
<212> DNA
<213> Artificial sequence

<220>

<223> Description of the artificial se⬤e:
    oligonucleotide (-) of insertion into p17-7

<400> 27
cagaattcct aagcttcagc ctgagag   27

<210> 28
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: end of the
    GST followed by the thrombine site

<400> 28
Ser Asp Leu Ser Gly Gly Gly Gly Gly Leu Val Pro Arg Gly Ser
 1   5   10   15

<210> 29
<211> 717
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: DNA
    coding for GST protein in the pGEXKT vector

<400> 29
atgtcccta tactaggtta ttggaaaatt aagggccttg tgcaacccac tcgacttctt 60
ttggaatatc ttgaagaaaa atatgaagag catttgtatg agcgcgatga aggtgataaa 120
tggcgaaaca aaaagtttga attgggtttg gagtttccca atcttcctta ttatattgat 180
ggtgatgtta aattaacaca gtctatggcc atcatacgtt atatagctga caagcacaac 240
atgttgggtg gttgtccaaa agagcgtgca gagatttcaa tgcttgaagg agcggttttg 300
gatattagat acggtgtttc gagaattgca tatagtaaag actttgaaac tctcaaagtt 360
gattttctta gcaagctacc tgaaatgctg aaaatgttcg aagatcgttt atgtcataaa 420
acatatttaa atggtgatca tgtaacccat cctgacttca tgttgtatga cgctcttgat 480
gttgttttat acatggaccc aatgtgcctg gatgcgttcc caaaattagt ttgttttaaa 540
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<210> 30
<211> 327
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: DNA
    coding for the thioredoxine in the pET32a+ vector

<400> 30
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gacggggcga tcctcgtcga tttctgggca gagtggtgcg gtccgtgcaa aatgatcgcc 120
ccgattctgg atgaaatcgc tgacgaatat cagggcaaac tgaccgttgc aaaactgaac 180
atcgatcaaa accctggcac tgcgccgaaa tatggcatcc gtggtatccc gactctgctg 240
ctgttcaaaa acggtgaagt ggcggcaacc aaagtgggtg cactgtctaa aggtcagttg 300
aaagagttcc tcgacgctaa cctggcc   ·   327

                                    7

<210> 31
<211> 4969
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: plasmide
expressing pGEXKT

<400> 31
acgttatcga ctgcacggtg caccaatgct tctggcgtca ggcagccatc ggaagctgtg 60
gtatggctgt gcaggtcgta aatcactgca taattcgtgt cgctcaaggc gcactcccgt 120
tctggataat gttttttgcg ccgacatcat aacggttctg gcaaatattc tgaaatgagc 180
tgttgacaat taatcatcgg ctcgtataat gtgtggaatt gtgagcggat aacaatttca 240
cacaggaaac agtattcatg tcccctatac taggttattg gaaaattaag ggccttgtgc 300
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<210> 32
<211> 11800
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: plasmide
      expressing pET32a+

<400> 32
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gaaccggcca ggttagcgtc gaggaactct ttcaactgac cttggcgcac cgtggtctgg 720
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9

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10

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<210> 33
<211> 2504
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: plasmide
      expressing pT7-7

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<210> 34
<211> 813
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression system
      coding for fusion protein GST-DP-TME1

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<210> 35
<211> 513
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression system
      coding for fusion protein TrX-DP-TME1

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ctgttcaaaa acggtgaagt ggcggcaacc aaagtgggtg cactgtctaa aggtcagttg 300
aaagagttcc tcgacgctaa cctggccggt tctggttctg gatctccaaa atcggatctg 360
tctggtggtg gtggtggtct ggttccgcgt ggatccgacc cgatcgctgg tgctcactgg 420
ggtgttctgg ctggtatcgc ttacttctct atggttggta ctgggctaa agttctggtt 480
gttctgctgc tgttcgctgg tgttgacgct tag   513

<210> 36
<211> 117
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression system
      coding for fusion protein M-DP-TME1

<400> 36
atggacccga tcgctggtgc tcactggggt gttctggctg gtatcgctta cttctctatg 60
gttggtaact gggctaaagt tctggttgtt ctgctgctgt tcgctggtgt tgacgct 117

<210> 37
<211> 795
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression system
      coding for fusion protein
      GST-DP-TME2

<400> 37
atgtccccta tactaggtta ttggaaaatt aagggccttg tgcaacccac tcgacttctt 60
ttggaatatc ttgaagaaaa atatgaagag catttgtatg agcgcgatga aggtgataaa 120
tggcgaaaca aaaagtttga attgggtttg gagttccca atcttcctta ttatattgat 180
ggtgatgtta aattaacaca gtctatggcc atcataċgtt atatagctga caagcacaac 240
atgttgggtg gttgtccaaa agagcgtgca gagatttcaa tgcttgaagg agcggttttg 300
gatattagat acggtgtttc gagaattgca tatagtaaag actttgaaac tctcaaagtt 360
gatttcctta gcaagctacc tgaaatgctg aaaatgttcg aagatcgttt atgtcataaa 420
acatatttaa atggtgatca tgtaacccat cctgacttca tgttgtatga cgctcttgat 480
gttgttttat acatggaccc aatgtgcctg gatgcgttcc caaaattagt ttgttttaaa 540
aaacgtattg aagctatccc acaaattgat aagtacttga aatccagcaa gtatatagca 600
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ctgtctggtg gtggtggtgg tctggttccg cgtg███ acccggaata cgttgttctg 720
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tctcaggctg aagct 795

<210> 38
<211> 486
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression system
    coding for fusion protein
TrX-DP-TME2

<400> 38
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gacggggcga tcctcgtcga tttctgggca gagtggtgcg gtccgtgcaa aatgatcgcc 120
ccgattctgg atgaaatcgc tgacgaatat cagggcaaac tgaccgttgc aaaactgaac 180
atcgatcaaa accctggcac tgcgccgaaa tatggcatcc gtggtatccc gactctgctg 240
ctgttcaaaa acggtgaagt ggcggcaacc aaagtgggtg cactgtctaa aggtcagttg 300
aaagagttcc tcgacgctaa cctggccggt tctggttctg gatctgatct gtctggtggt 360
ggtggtggtc tggttccgcg tggatccgac ccggaatacg ttgttctgct gttcctgctg 420
ctggctgacg ctcgtgtttg ctcttgcctg tggatgatgc tgctgatctc tcaggctgaa 480
gcttag 486

<210> 39
<211> 99
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression system
    coding for fusion protein M-DP-TME2

<400> 39
atggacccgg aatacgttgt tctgctgttc ctgctgctgg ctgacgctcg tgtttgctct 60
tgcctgtgga tgatgctgct gatctctcag gctgaagct 99

<210> 40
<211> 5082
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression vector
    pGEXKT-dp-Pt(TME1)

<400> 40
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tctgataat gttttttgcg ccgacatcat aacggttctg gcaaatattc tgaaatgagc 180
tgttgacaat taatcatcgg ctcgtataat gtgtggaatt gtgagcggat aacaatttca 240
cacaggaaac agtattcatg tcccctatac taggttattg gaaaattaag ggccttgtgc 300
aacccactcg acttcttttg gaatatcttg aagaaaaata tgaagagcat ttgtatgagc 360
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ttgaaactct caaagttgat tttcttagca agctacctga atgctgaaa atgttcgaag 660
atcgtttatg tcataaaaca tatttaaatg gtgatcatgt aacccatcct gacttcatgt 720

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caggaaggcc agacgcgaat tattttttgat ggcgttggaa tt   5082

<210> 41
<211> 5064
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression vector
        pGEXKT-dp-Pt(TME2)

<400> 41
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gtatggctgt gcaggtcgta aatcactgca taattcgtgt cgctcaaggc gcactcccgt 120
tctggataat gtttttttgcg ccgacatcat aacggttctg gcaaatattc tgaaatgagc 180
tgttgacaat taatcatcgg ctcgtataat gtgtggaatt gtgagcggat aacaatttca 240
cacaggaaac agtattcatg tcccctatac taggttattg gaaaattaag ggccttgtgc 300
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attattttg atggcgttgg aatt   5064

<210> 42
<211> 5918
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression vector
     pET32a-dp-Pt(TME1)

<400> 42
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ggggttatgc tagttattgc tcagcggtgg cagcagccaa ctcagcttcc tttcgggctt 120
tgttagcagc cggatctcag tggtggtggt ggtggtgctc gagtgcggcc gcaagcttgt 180
cgacggagct cgaattccta agcgtcaaca ccagcgaaca gcagcagaac aaccagaact 240
ttagcccagt taccaaccat agagaagtaa gcgataccag ccagaacacc ccagtgagca 300
ccagcgatcg ggtcggatcc acgcggaacc agaccaccac caccaccaga cagatccgat 360
tttggagatc cagaaccaga accggccagt ttagcgtcga ggaactcttt caactgacct 420

                                18

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<211> 5891
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression vector
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20

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<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression vector
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agcatcttac ggatggcatg acagtaagag aattatgcag tgctgccata accatgagtg 2100
ataacactgc ggccaactta cttctgacaa cgatcggagg accgaaggag ctaaccgctt 2160
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aagccatacc aaacgacgag cgtgacacca cg●●●gt agcaatggca acaacgttgc 2280
gcaaactatt aactggcgaa ctacttactc tagctt●●●g gcaacaatta atagactgga 2340
tggaggcgga taaagttgca ggaccacttc tgcgctcggc ccttccggct ggctggttta 2400
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cagatggtaa gccctcccgt atcgtagtta tctacacgac ggggagtcag gcaactatgg 2520
atgaacgaaa tagacagatc gctgagatag gtgcctcact gattaagcat tggtaactgt 2580
cagaccaagt ttactcatat atactttaga ttgattt   2617

<210> 45
<211> 2599
<212> DNA
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: expression vector
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<400> 45
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caagagcaaa cacgagcgtc agccagcagc aggaacagca gaacaacgta ttccgggtcc 180
atatgtatat ctccttctta aagttaaaca aaattatttc tagagggaaa ccgttgtggt 240
ctccctatag tgagtcgtat taatttcgaa gtctatcaga agttcgaatc gctgggcctc 300
gcgcgtttcg gtgatgacgg tgaaaacctc tgacacatgc agctcccgga gacggtcaca 360
gcttgtctgt aagcggatgc cgggagcaga caagcccgtc agggcgcgtc agcgggtgtt 420
ggcgggtgtc ggggcgcagc catgacccag tcacgtagcg atagcggagt gtatatactg 480
gcttaactat gcggcatcag agcagattgt actgagagtg caccatagga agatcttccg 540
gaagatcttc ctatgcggtg tgaaataccg cacagatgcg taaggagaaa ataccgcatc 600
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caggaccact tctgcgctcg gcccttccgg ctggctggtt tattgctgat aaatctggag 2400
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gtatcgtagt tatctacacg acggggagtc aggcaactat ggatgaacga aatagacaga 2520
tcgctgagat aggtgcctca ctgattaagc attggtaact gtcagaccaa gtttactcat 2580
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<210> 46
<211> 271
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: fusion protein
    GST-DP-TME1

<400> 46
Met Ser Pro Ile Leu Gly Tyr Trp Lys Ile Lys Gly Leu Val Gln Pro
 1   5   10   15

Thr Arg Leu Leu Leu Glu Tyr Leu Glu Glu Lys Tyr Glu Glu His Leu
            20   25   30

Tyr Glu Arg Asp Glu Gly Asp Lys Trp Arg Asn Lys Lys Phe Glu Leu
        35   40   45

Gly Leu Glu Phe Pro Asn Leu Pro Tyr Tyr Ile Asp Gly Asp Val Lys
        50   55   60

Leu Thr Gln Ser Met Ala Ile Ile Arg Tyr Ile Ala Asp Lys His Asn
65   70   75   80

Met Leu Gly Gly Cys Pro Lys Glu Arg Ala Glu Ile Ser Met Leu Glu
                85   90   95

Gly Ala Val Leu Asp Ile Arg Tyr Gly Val Ser Arg Ile Ala Tyr Ser
            100   105   110

Lys Asp Phe Glu Thr Leu Lys Val Asp Phe Leu Ser Lys Leu Pro Glu
            115   120   125

Met Leu Lys Met Phe Glu Asp Arg Leu Cys His Lys Thr Tyr Leu Asn
    130   135   140

Gly Asp His Val Thr His Pro Asp Phe Met Leu Tyr Asp Ala Leu Asp
145   150   155   160

Val Val Leu Tyr Met Asp Pro Met Cys Leu Asp Ala Phe Pro Lys Leu
                165   170   175

Val Cys Phe Lys Lys Arg Ile Glu Ala Ile Pro Gln Ile Asp Lys Tyr
            180   185   190

Leu Lys Ser Ser Lys Tyr Ile Ala Trp Pro Leu Gln Gly Trp Gln Ala
            195   200   205

Thr Phe Gly Gly Gly Asp His Pro Pro Lys Ser Asp Leu Ser Gly Gly
    210   215   220

Gly Gly Gly Leu Val Pro Arg Gly Ser Asp Pro Ile Ala Gly Ala His
225   230   235   240

Trp Gly Val Leu Ala Gly Ile Ala Tyr Phe Ser Met Val Gly Asn Trp
                245   250   255

Ala Lys Val Leu Val Val Leu Leu Leu Phe Ala Gly Val Asp Ala
                260   265   270

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<210> 47
<211> 265
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: fusion protein
      GST-DP-TME2

<400> 47
Met Ser Pro Ile Leu Gly Tyr Trp Lys Ile Lys Gly Leu Val Gln Pro
 1   5   10   15

Thr Arg Leu Leu Leu Glu Tyr Leu Glu Glu Lys Tyr Glu Glu His Leu
         20   25   30

Tyr Glu Arg Asp Glu Gly Asp Lys Trp Arg Asn Lys Lys Phe Glu Leu
      35   40   45

Gly Leu Glu Phe Pro Asn Leu Pro Tyr Tyr Ile Asp Gly Asp Val Lys
   50   55   60

Leu Thr Gln Ser Met Ala Ile Ile Arg Tyr Ile Ala Asp Lys His Asn
65   70   75   80

Met Leu Gly Gly Cys Pro Lys Glu Arg Ala Glu Ile Ser Met Leu Glu
            85   90   95

Gly Ala Val Leu Asp Ile Arg Tyr Gly Val Ser Arg Ile Ala Tyr Ser
         100   105   110

Lys Asp Phe Glu Thr Leu Lys Val Asp Phe Leu Ser Lys Leu Pro Glu
         115   120   125

Met Leu Lys Met Phe Glu Asp Arg Leu Cys His Lys Thr Tyr Leu Asn
         130   135   140

Gly Asp His Val Thr His Pro Asp Phe Met Leu Tyr Asp Ala Leu Asp
145   150   155   160

Val Val Leu Tyr Met Asp Pro Met Cys Leu Asp Ala Phe Pro Lys Leu
            165   170   175

Val Cys Phe Lys Lys Arg Ile Glu Ala Ile Pro Gln Ile Asp Lys Tyr
            180   185   190

Leu Lys Ser Ser Lys Tyr Ile Ala Trp Pro Leu Gln Gly Trp Gln Ala
         195   200   205

Thr Phe Gly Gly Gly Asp His Pro Pro Lys Ser Asp Leu Ser Gly Gly
   210   215   220

Gly Gly Gly Leu Val Pro Arg Gly Ser Asp Pro Glu Tyr Val Val Leu
225   230   235   240

Leu Phe Leu Leu Leu Ala Asp Ala Arg Val Cys Ser Cys Leu Trp Met
            245   250   255

Met Leu Leu Ile Ser Gln Ala Glu Ala
   260   265

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<210> 48
<211> 170
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: fusion protein
    TrX-DP-TME1

<400> 48
Met Ser Asp Lys Ile Ile His Leu Thr Asp Asp Ser Phe Asp Thr Asp
 1   5   10   15

Val Leu Lys Ala Asp Gly Ala Ile Leu Val Asp Phe Trp Ala Glu Trp
            20   25   30

Cys Gly Pro Cys Lys Met Ile Ala Pro Ile Leu Asp Glu Ile Ala Asp
        35   40   45

Glu Tyr Gln Gly Lys Leu Thr Val Ala Lys Leu Asn Ile Asp Gln Asn
    50   55   60

Pro Gly Thr Ala Pro Lys Tyr Gly Ile Arg Gly Ile Pro Thr Leu Leu
65   70   75   80

Leu Phe Lys Asn Gly Glu Val Ala Ala Thr Lys Val Gly Ala Leu Ser
                85   90   95

Lys Gly Gln Leu Lys Glu Phe Leu Asp Ala Asn Leu Ala Gly Ser Gly
            100   105   110

Ser Gly Ser Pro Lys Ser Asp Leu Ser Gly Gly Gly Gly Gly Leu Val
            115   120   125

Pro Arg Gly Ser Asp Pro Ile Ala Gly Ala His Trp Gly Val Leu Ala
            130   135   140

Gly Ile Ala Tyr Phe Ser Met Val Gly Asn Trp Ala Lys Val Leu Val
145   150   155   160

Val Leu Leu Leu Phe Ala Gly Val Asp Ala
                165   170

<210> 49
<211> 161
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: fusion protein
    TrX-DP-TME2

<400> 49
Met Ser Asp Lys Ile Ile His Leu Thr Asp Asp Ser Phe Asp Thr Asp
 1   5   10   15

Val Leu Lys Ala Asp Gly Ala Ile Leu Val Asp Phe Trp Ala Glu Trp
            20   25   30

Cys Gly Pro Cys Lys Met Ile Ala Pro Ile Leu Asp Glu Ile Ala Asp
                35   40   45

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Glu Tyr Gln Gly Lys Leu Thr Val Al⬤ Leu Asn Ile Asp Gln Asn
   50   55   60

Pro Gly Thr Ala Pro Lys Tyr Gly Ile Arg Gly Ile Pro Thr Leu Leu
65   70   75   80

Leu Phe Lys Asn Gly Glu Val Ala Ala Thr Lys Val Gly Ala Leu Ser
       85   90   95

Lys Gly Gln Leu Lys Glu Phe Leu Asp Ala Asn Leu Ala Gly Ser Gly
      100   105   110

Ser Gly Ser Asp Leu Ser Gly Gly Gly Gly Leu Val Pro Arg Gly
     115   120   125

Ser Asp Pro Glu Tyr Val Val Leu Leu Phe Leu Leu Leu Ala Asp Ala
   130   135   140

Arg Val Cys Ser Cys Leu Trp Met Met Leu Leu Ile Ser Gln Ala Glu
145   150   155   160

Ala

<210> 50
<211> 39
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: fusion protein
    M-DP-TME1

<400> 50
Met Asp Pro Ile Ala Gly Ala His Trp Gly Val Leu Ala Gly Ile Ala
 1   5   10   15

Tyr Phe Ser Met Val Gly Asn Trp Ala Lys Val Leu Val Val Leu Leu
      20   25   30

Leu Phe Ala Gly Val Asp Ala
     35

<210> 51
<211> 33
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence: fusion protein
    M-DP-TME2

<400> 51
Met Asp Pro Glu Tyr Val Val Leu Leu Phe Leu Leu Leu Ala Asp Ala
 1   5   10   15

Arg Val Cys Ser Cys Leu Trp Met Met Leu Leu Ile Ser Gln Ala Glu
      20   25   30

Ala

<210> 52
<211> 239
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
    glutathion transferase (GST)

<400> 52
Met Ser Pro Ile Leu Gly Tyr Trp Lys Ile Lys Gly Leu Val Gln Pro
 1   5   10   15

Thr Arg Leu Leu Leu Glu Tyr Leu Glu Glu Lys Tyr Glu Glu His Leu
            20   25   30

Tyr Glu Arg Asp Glu Gly Asp Lys Trp Arg Asn Lys Lys Phe Glu Leu
        35   40   45

Gly Leu Glu Phe Pro Asn Leu Pro Tyr Tyr Ile Asp Gly Asp Val Lys
    50   55   60

Leu Thr Gln Ser Met Ala Ile Ile Arg Tyr Ile Ala Asp Lys His Asn
65   70   75   80

Met Leu Gly Gly Cys Pro Lys Glu Arg Ala Glu Ile Ser Met Leu Glu
            85   90   95

Gly Ala Val Leu Asp Ile Arg Tyr Gly Val Ser Arg Ile Ala Tyr Ser
        100   105   110

Lys Asp Phe Glu Thr Leu Lys Val Asp Phe Leu Ser Lys Leu Pro Glu
        115   120   125

Met Leu Lys Met Phe Glu Asp Arg Leu Cys His Lys Thr Tyr Leu Asn
    130   135   140

Gly Asp His Val Thr His Pro Asp Phe Met Leu Tyr Asp Ala Leu Asp
145   150   155   160

Val Val Leu Tyr Met Asp Pro Met Cys Leu Asp Ala Phe Pro Lys Leu
            165   170   175

Val Cys Phe Lys Lys Arg Ile Glu Ala Ile Pro Gln Ile Asp Lys Tyr
        180   185   190

Leu Lys Ser Ser Lys Tyr Ile Ala Trp Pro Leu Gln Gly Trp Gln Ala
        195   200   205

Thr Phe Gly Gly Gly Asp His Pro Pro Lys Ser Asp Leu Ser Gly Gly
    210   215   220

Gly Gly Gly Leu Val Pro Arg Gly Ser Pro Gly Ile His Arg Asp
225   230   235

<210> 53
<211> 170
<212> PRT
<213> Artificial sequence

<220>
<223> Description of the artificial sequence:
thioredoxine (TrX)

<400> 53
Met Ser Asp Lys Ile Ile His Leu Thr Asp Asp Ser Phe Asp Thr Asp
 1   5   10   15

Val Leu Lys Ala Asp Gly Ala Ile Leu Val Asp Phe Trp Ala Glu Trp
        20   25   30

Cys Gly Pro Cys Lys Met Ile Ala Pro Ile Leu Asp Glu Ile Ala Asp
        35   40   45

Glu Tyr Gln Gly Lys Leu Thr Val Ala Lys Leu Asn Ile Asp Gln Asn
        50   55   60

Pro Gly Thr Ala Pro Lys Tyr Gly Ile Arg Gly Ile Pro Thr Leu Leu
 65   70   75   80

Leu Phe Lys Asn Gly Glu Val Ala Ala Thr Lys Val Gly Ala Leu Ser
            85   90   95

Lys Gly Gln Leu Lys Glu Phe Leu Asp Ala Asn Leu Ala Gly Ser Gly
        100   105   110

Ser Gly Ser Pro Lys Ser Asp Leu Ser Gly Gly Gly Gly Gly Leu Val
        115   120   125

Pro Arg Gly Ser Asp Pro Ile Ala Gly Ala His Trp Gly Val Leu Ala
        130   135   140

Gly Ile Ala Tyr Phe Ser Met Val Gly Asn Trp Ala Lys Val Leu Val
145   150   155   160

Val Leu Leu Leu Phe Ala Gly Val Asp Ala
        165   170